

CLAIMS

1. A motor control apparatus comprising:
an inverter circuit which receives a
fluctuating voltage, converts said voltage into a
desired voltage and outputs said desired voltage to a
brushless motor, and

a control section which receives the input
voltage to said inverter circuit, a motor current
flowing to said brushless motor and a motor current
command value indicating the value of a current
required to flow to said inverter circuit, for
controlling said inverter circuit by maintaining the
phase of the voltage applied to said brushless motor
when the value of the input voltage to said inverter
circuit is smaller than the value of a voltage
required to be applied to said brushless motor.

2. A motor control apparatus in accordance
with claim 1, wherein said control section estimates
the rotation phase of said brushless motor on the
basis of the current of said brushless motor.

3. A motor control apparatus in accordance
with claim 1, wherein said control section stops
integral control when the voltage value across said

inverter circuit is smaller than the voltage command value to be applied to said brushless motor.

4. A motor control apparatus in accordance with claim 1, wherein said control section calculates said voltage command value by using a calculation equation having a noninteracting term.

5. A motor control apparatus in accordance with claim 1, wherein said control section detects the voltage of said inverter circuit, estimates a voltage to be applied to said inverter circuit at the next control cycle and controls said inverter circuit.

6. A motor control apparatus in accordance with claim 1, incorporating a capacitor having a small capacitance on the input side of said inverter circuit.

7. A motor control apparatus in accordance with claim 1, incorporating an inductor having a small inductance on the input side of said inverter circuit.

8. A motor control apparatus in accordance with claim 1, further comprising:

a boosting circuit having an inductor, diodes, switching devices and a capacitor, and

a boosting circuit control section for controlling said boosting circuit, wherein

said boosting circuit control section determines the duty value of said switching device on the basis of a signal from said control section.

9. A motor control apparatus in accordance with claim 8, wherein said boosting circuit control section, which is configured to receive the detected voltage phase and AC current of an AC power source, comprises:

an AC current command section that outputs an AC current command value on the basis of said detected phase and a control signal from said control section, and

a PWM command generation section that generates PWM command values for driving said switching devices on the basis of said AC current command value and said detected AC current of said AC power source and outputs said PWM command values.

10. A motor control apparatus in accordance with claim 1, further comprising:

a boosting circuit having an inductor to which a fluctuating voltage is input, a plurality of diodes forming a rectifying circuit, switching devices

connected to said rectifying circuit and performing ON/OFF operation, and a capacitor outputting a boosted voltage, and

a boosting circuit control section for controlling said boosting circuit.

11. A motor control apparatus in accordance with claim 6, wherein

$$C \leq 2 \times 10^{-7} \times P$$

is established, assuming that the capacitance of said capacitor is C [F] and that the maximum output of said motor is P [W].

12. A motor control apparatus in accordance with claim 6, incorporating an inductor having a small inductance on the input side of said inverter circuit, wherein

$$L \leq 9 \times 10^{-9} / C$$

is established, assuming that the inductance of said inductor is L [H] and that the capacitance of said capacitor is C [F].

13. A motor control apparatus in accordance with claim 7, wherein

$$L \leq P \times 10^{-6}$$

is established, assuming that the inductance of said

inductor is L [H] and that the maximum output power of said motor is P [W].

14. A compressor incorporating said motor control apparatus in accordance with claim 2.

15. An air conditioner incorporating said motor control apparatus in accordance with claim 1.

16. An air conditioner incorporating said motor control apparatus in accordance with claim 2.

17. A refrigerator incorporating said motor control apparatus in accordance with claim 1.

18. A refrigerator incorporating said motor control apparatus in accordance with claim 2.

19. An electric washing machine incorporating said motor control apparatus in accordance with claim 1.

20. An electric washing machine incorporating said motor control apparatus in accordance with claim 2.

21. An electric dryer incorporating said motor control apparatus in accordance with claim 1.

22. An electric dryer incorporating said motor control apparatus in accordance with claim 2.

23. A blower incorporating said motor control apparatus in accordance with claim 1.

24. An electric vacuum cleaner incorporating said motor control apparatus in accordance with claim 1.

25. A heat pump water heater incorporating said motor control apparatus in accordance with claim 1.

26. A heat pump water heater incorporating said motor control apparatus in accordance with claim 2.